

Media Information

7 November 2007

## **Advance warning of drivers heading in the wrong direction - the "Wrong-way driver" information**

To prevent drivers from taking the wrong-way direction and to warn all road users at an early stage about a "wrong-way driver", BMW Group Research and Technology presents a unique assistance system.

**Munich.** Every year, radio stations report some 1,800 wrong-way drivers – in Germany alone. And, according to transport researchers, the next wrong-way driver on the road could very well be you or I. The reasons for travelling the wrong way down a public highway are more often than not decidedly mundane and have nothing to do with age – indeed, only 10 % of wrong-way drivers are over 65. In a study on this area of road safety, the most frequent causes of such behaviour have been identified as stress and overexertion, loss of bearings and poor visibility. Alcohol, meanwhile, is a factor with a third of wrong-way drivers.

It is the nightmare scenario for every driver: a wrong-way driver heading towards you from out of nowhere in the middle of the motorway. Because of the relative speed, the driver has only fractions of a second to react. If a collision is unavoidable, its consequences are often fatal. It doesn't take much imagination to see that a head-on collision between two vehicles both travelling at, say, 120 km/h is going to have very serious consequences, despite sophisticated passive safety systems and well-developed passenger safety cells.

To prevent driving in the wrong direction or to warn other road users at an early stage to increase road safety, BMW Group Research and Technology has developed a new driver assistance system. Using the car's navigation system as a basis, the wrong-way driver information system automatically recognises when a driver is about to join a road in the wrong direction and triggers a warning made up of audible and visual signals. Beyond this, the wrong-way driver information system can also use vehicle-to-vehicle communication to warn other vehicles when a wrong-way driver is approaching on the same road. Last but not least the information about the wrong-way driver can be sent to a service centre by the "wrong-way vehicle" and be fed in the "warning chain". Thus the information is available for all road users in just a few minutes.

### **Wrong-way driving: three levels provide fast information.**

The aim of this assistance system is first and foremost to prevent people from driving the wrong way down a road in the first place. The system uses navigation data – which could conceivably be complemented by road sign recognition – to identify an instance of the driver potentially heading in the

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wrong direction. The driver is alerted to the potential danger by audible and visual indications on the instrument cluster or in the Head-up Display.

However, should the driver still join a motorway or one-way street in the wrong direction, the main priority is to warn other road users – which is where Car2Xcommunication comes in. In the research project, the oncoming wrong-way driver can be pinpointed using the map on the navigation display. The sections of road on which the offender is currently on the move are highlighted, the system complementing the data from the navigation system with the position, direction and speed of the wrong-way driver. This information can also be viewed in the Head-up Display at regular intervals – and for as long as the wrong-way driver remains on the wrong side of the road. Audible warning signals also help in a critical situation. The frequency of the audible and visual warnings is graded through three levels – from wrong-way driver is in the area to wrong-way driver immediately ahead.

### **Integrated communications enhance safety.**

Wrong-way driver information is transmitted on two communications channels. Fast, but with a current maximum range of 600 metres, the vehicle-to-vehicle channel (Car2Car) is used for close-up identification of the vehicles in the immediate area.

Der Fahrzeug-Infrastruktur Kommunikationskanal (Car2Infrastructure) dient wiederum dazu, die Geisterfahrerinformation anderen Fahrzeugen in der weiteren Umgebung zur Verfügung zu stellen. Dies geschieht, in dem das Fahrzeug des Falschfahrers seine Positionsdaten an ein Servicezentrum sendet und dieses dann die Warnung an alle Fahrzeuge weiterleitet. Das Servicezentrum kann darüber hinaus direkt Polizei oder Medien mit den Daten versorgen. Wertvolle Minuten, in denen noch niemand den Falschfahrer gesehen, als solchen erkannt und gemeldet hat, werden gewonnen. Damit wird die Meldekette verkürzt, schon mit dem ersten ausgestatteten Fahrzeug. Die hilfreiche Information steht allen Verkehrsteilnehmern schnell zur Verfügung – direkt durch Fahrzeug-Fahrzeug-Kommunikation oder über Radioverkehrsmeldungen.

The role of the vehicle infrastructure communications channel (Car2Infrastructure), meanwhile, is to carry the information to other vehicles in the wider area. The vehicle driven by the wrong-way driver sends its position to a service centre, which then passes on the warning to all other vehicles. The service centre can supply both police and media with the data directly. And that can cut the time in which the wrong-way driver has yet to be seen by any road users – or identified as such – by valuable minutes. Just a single vehicle equipped with this technology shortens the “warning chain” and the information transmitted benefits all drivers, whether they receive it through vehicle-to-vehicle communication or radio traffic bulletins.

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Current Information on further topics in the field "Research for increased road safety" you can find in the press kit "BMW Group Innovation Day 2007 Research and Technology".

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